

10/717,875  
706.003PA*In the Claims:*

Please amend Claims 1 to 20 as follows:

- 1 1. (Currently amended) Process for ultrahigh temperature pasteurization of a  
2 liquid food product using a pasteurization arrangement having a first product-to-  
3 product regenerative heat exchanger, a first heater stage, a second product-to-  
4 product heat exchanger, and a UHT heater stage; comprising the steps of  
5 supplying said liquid food product through a raw-product side of said first  
6 regenerative heat exchanger to pre-heat same;  
7 heating said preheated liquid food product exiting the first heat exchanger to  
8 a predetermined intermediate temperature suitable for denaturizing proteins in the  
9 liquid food product;  
10 flowing the liquid food product at said intermediate temperature through a  
11 timing tube to hold the product at said intermediate temperature for a  
12 predetermined time sufficient for denaturing said proteins therein, wherein said  
13 predetermined intermediate temperature at which said denaturing occurs is  
14 substantially 175 degrees F, and wherein said predetermined time that said timing  
15 tube holds the product at said intermediate temperature is at least sixty seconds;  
16 flowing said liquid food product from said timing tube through a raw-  
17 product side of said second regenerative heat exchanger to preheat the same from  
18 said intermediate temperature to a temperature near a UHT pasteurizing  
19 temperature;  
20 flowing the liquid food product exiting said second heat exchanger into a  
21 liquid medium-to-product heater in said UHT heater stage to heat the liquid food

10/717,875  
706.003PA

22 product to a predetermined UHT temperature, the UHT heater stage including  
23 means supplying a heated liquid medium in counterflow to said product through  
24 said liquid medium-to-product heater;

25 holding the liquid food product exiting said medium-to-product heater at  
26 said UHT temperature for a predetermined length of time;

27 flowing the liquid food product through a pasteurized side of said second  
28 regenerative heat exchanger in counterflow to the liquid food product flowing in  
29 the raw side thereof to transfer heat to the product flowing in the raw side thereof;

30 flowing the liquid food product exiting the pasteurized side of the second  
31 regenerative heat exchanger through a pasteurized side of the first regenerative  
32 heat exchanger in counterflow to the liquid food product flowing in the raw side  
33 thereof to transfer heat to the product flowing in the raw side thereof; and

34 further processing the liquid food product leaving the pasteurized side of the  
35 first regenerative heat exchanger to prepare same for packaging;

36 wherein a temperature differential in the medium-to-product heater between  
37 the liquid food product and said heating medium at every point of reference in the  
38 heater is less than 20 degrees F.

1 2. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 1 wherein the liquid food product has a product volume rate of  
3 flow through said liquid medium to product heater and said heated liquid medium  
4 has a liquid medium volume rate of flow through said heater, and the ratio of the  
5 liquid medium rate of flow to the product rate of flow is below 3:1.

10/717,875  
706.003PA

1 3. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 1 wherein said ratio of liquid medium to product flow rates is  
3 about 2:1.

1 4. (Original) The process for ultrahigh temperature pasteurization according to  
2 Claim 1 wherein the temperature differential in the medium-to-product heater  
3 between the product leaving and the medium entering is about 5 degrees F.

1 5. (Original) The process for ultrahigh temperature pasteurization according to  
2 Claim 1 wherein the temperature differential in the medium-to-product heater  
3 between the product entering and the medium leaving is about 15 degrees F.

1 6. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 1 wherein the temperature differential in the second  
3 regenerative heat exchanger between the product leaving the raw side and the  
4 product entering the pasteurized side is than 20 degrees F.

1 7. (Canceled)

1 8. (Canceled)

1 9. (Original) The process for ultrahigh temperature pasteurization according to

10/717,875  
706.003PA

2 Claim 1 further comprising passing said product through a homogenizer prior to  
3 flowing the same through the raw side of the second regenerative heat exchanger.

1 10. (Original) The process for ultrahigh temperature pasteurization according to  
2 Claim 6 wherein said first and second regenerative heat exchangers are tube-in-  
3 tube counterflow heat exchangers.

1 11. (Currently amended) Process for ultrahigh temperature pasteurization of a  
2 liquid food product using a pasteurization arrangement having a first product-to-  
3 product regenerative heat exchanger, a first heater stage, a second product-to-  
4 product heat exchanger, and a UHT heater stage; comprising the steps of  
5 supplying said liquid food product through a raw-product side of said first  
6 regenerative heat exchanger to pre-heat same said preheated liquid food product  
7 exiting the first heat exchanger to a predetermined intermediate temperature  
8 sufficient for denaturizing proteins in the liquid food product, wherein said  
9 predetermined intermediate temperature at which said denaturing occurs is  
10 substantially 175 degrees F, and maintaining the liquid food product in a timing  
11 tube to hold the product at said intermediate temperature for predetermined time of  
12 at least sixty seconds;

13 flowing the liquid food product at said intermediate temperature through a  
14 device to hold the product at said intermediate temperature for a predetermined  
15 length of time sufficient for denaturing said proteins therein;

16 flowing said liquid food product from said device through a raw-product

10/717,875  
706.003PA

17 side of said second regenerative heat exchanger to preheat the same from said  
18 intermediate temperature to a temperature near a UHT pasteurizing temperature;

19 flowing the liquid food product exiting said second heat exchanger into a  
20 liquid medium-to-product heater in said UHT heater stage to heat the liquid food  
21 product to a predetermined UHT temperature, the UHT heater stage including  
22 means supplying a heated liquid medium in counterflow to said product through  
23 said liquid medium-to-product heater;

24 holding the liquid food product exiting said liquid medium-to-product  
25 heater at said UHT temperature for a predetermined length of time;

26 flowing the liquid food product through a pasturized side of said second  
27 regenerative heat exchanger in counterflow to the liquid food product flowing in  
28 the raw side thereof to transfer heat to the product flowing in the raw side thereof;

29 flowing the liquid food product exiting the pasteurized side of the second  
30 regenerative heat exchanger through a pasteurized side of the first regenerative  
31 heat exchanger in counterflow to the liquid food product flowing in the raw side  
32 thereof to transfer heat to the product flowing in the raw side thereof; and

33 further processing the liquid food product leaving the pasteurized side of the  
34 first regenerative heat exchanger to prepare same for packaging;

35 wherein a temperature differential in the liquid medium-to-product heater  
36 between the liquid food product and said heated liquid medium at every point of  
37 reference in the heater is less than 20 degrees F.

1 12. (Previously presented) The process for ultrahigh temperature pasteurization

10/717,875  
706.003PA

2 according to Claim 11 wherein the liquid food product has a product volume rate  
3 of flow through said medium to product heater and said heated liquid medium has  
4 a liquid medium volume rate of flow through said heater, and the ratio of the  
5 liquid medium rate of flow to the product rate of flow is below 3:1.

1 13. (Currently amended) Process for ultrahigh temperature pasteurization of a  
2 liquid food product using a pasteurization arrangement having a product-to-  
3 product regenerative heat exchanger and a UHT heater stage; comprising the steps  
4 of

5 supplying said liquid food product through a raw-product side of said  
6 regenerative heat exchanger to pre-heat same, including denaturizing proteins in  
7 the liquid food product by holding the liquid food product in a timing tube for a  
8 predetermined time at a predetermined intermediate temperature, wherein said  
9 predetermined intermediate temperature at which said denaturing occurs is  
10 substantially 175 degrees F, and wherein said predetermined time that said timing  
11 tube holds the product at said intermediate temperature is at least sixty seconds,  
12 and preheating the liquid food product from said to a temperature near a UHT  
13 pasteurizing temperature;

14 flowing the liquid food product exiting said regenerative heat exchanger  
15 into a liquid medium-to-product heater in said UHT heater stage to heat the liquid  
16 food product to a predetermined UHT temperature, the UHT heater stage  
17 including means supplying a heated liquid medium in counterflow to said product  
18 through said medium to product heater;

10/717,875  
706.003PA

19 holding the liquid food product exiting said medium-to-product heater at  
20 said UHT temperature for a predetermined length of time;

21 flowing the liquid food product through a pasturized side of said  
22 regenerative heat exchanger in counterflow to the liquid food product flowing in  
23 the raw side thereof to transfer heat to the product flowing in the raw side thereof;  
24 and

25 further processing the liquid food product leaving the pasteurized side of the  
26 regenerative heat exchanger to prepare same for packaging;

27 wherein a temperature differential in the medium-to-product heater between  
28 the liquid food product and said heated liquid medium at every point of reference  
29 in the heater is less than 20 degrees F.

30 14. (Previously presented) The process for ultrahigh temperature pasteurization  
31 according to Claim 13 wherein the liquid food product has a product volume rate  
32 of flow through said liquid medium to product heater and said heated liquid  
33 medium has a liquid medium volume rate of flow through said heater, and the ratio  
34 of the liquid medium rate of flow to the product rate of flow is below 3:1.

1 15. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 14 wherein said ratio of heated liquid medium to product flow  
3 rates is about 2:1.

1 16. (Previously presented) The process for ultrahigh temperature pasteurization

10/717,875  
706.003PA

2 according to Claim 13 wherein the temperature differential in the medium-to-  
3 product heater between the product leaving and the heated liquid medium entering  
4 is about 5 degrees F.

1 17. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 13 wherein the temperature differential in the medium-to-  
3 product heater between the product entering and the heated liquid medium  
4 leaving is about 15 degrees F.

1 18. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 13 wherein the temperature differential in the regenerative heat  
3 exchanger between the product leaving the raw side and the product entering the  
4 pasteurized side is less than 20 degrees F.

1 19. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 13 wherein the product flowing through said medium-to-  
3 product heater has a flow velocity of below nine feet per second.

1 20. (Previously presented) The process for ultrahigh temperature pasteurization  
2 according to Claim 19 wherein said flow velocity is no greater than six feet per  
3 second.

21 to 30. (Canceled)